Engineering Justification Paper

Property Management and Projects

Final Version

Date: December 2019

Author: Ashley Wheelhouse

Classification: Highly Confidential

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2 Introduction

This programme is for the capital costs of planned end of life asset replacement for occupied building and security assets. Property Management is part of the wider property function, work is ongoing in GD1 to implement a new property management strategy in support of the core business.

Pre-emptive end of life replacement is a key part of the strategy and is the preferred intervention option. The strategy is based on legislative requirements, industry data and asset condition. Its aim is to reduce business risk and maximise avoidable costs, through unplanned failure of building assets resulting in business disruption, safety and security related incidents and productivity loss through poor quality working environments.

The strategy is modelled on BS 8544 Life Cycle Costs and the CROME model, outlined below in **Figure 1**, and CIBSE Guide M – Maintenance Engineering and Management:

Figure 1: CROME model

Initial construction or replacement of buildings are bespoke projects via the property development strategy. Property Management focuses on existing occupied buildings. Operation and maintenance costs are funded as part of the Property Management Opex submission and are based on "Scheduled (PPM - Planned) and Corrective (RRM - Reactive) maintenance, which ensure building assets operate as intended and reach or exceed their lifecycle.

2.1 General Background

Our property asset management strategy consists of the following key elements: -

- **Asset Database** – Procure and implement an asset database to store sites and asset data and track planned and reactive maintenance
- **Develop Asset Classification** – Create an asset classification structure within the Asset Database
- **Site Assessment & Capture**– Identify all "occupied premises" against agreed criteria, survey, produce site information including net usable area and site plans
- **Asset Capture** – Complete site asset capture for all classifications, including age, condition, date of install, asset lifecycle and indicative cost of replacement

- **Scheduled Maintenance and Replacement** Frequencies – Develop planned preventative maintenance activities with frequencies and identify replacement frequencies for all asset systems
- **Supply Chain Rationalisation** – Implementation of a contract placement plan to appoint competent suppliers and contractors for each specialism

Progress is being made on the implementation of the above strategy in the latter part of GD1. This programme utilises an elemental asset model based on average net usable area per site. The model projects replacement costs for each asset classification element, based on RICS NRM, SPONS price book data, procured costs and CIBSE indicative asset lifecycle data.

3 Equipment Summary

The equipment covered in this programme are all fixed assets at all 44 occupied sites across the Scotland and Southern Networks. Occupied sites include offices, depots and satellite sites.

Sites have been assessed to determine occupancy against the following definition (adapted from HSE and CIA guidance):

A building will be categorised as occupied if: -

- it has personnel assigned
- there is evidence of current occupation (e.g. personal effects, desk with chairs, PC, radio, kettle, etc) or
- it is used for a recurring personnel function (e.g. changing, training).
- Buildings which are occupied in emergencies as shown by the SGN emergency response procedure
- One or more people are present regularly for more than two hours in any 24-hour period.

Each occupied site has been surveyed and the net internal area captured. The model categorises sites based on their net internal area against the following metric in **Table 1**: -

Table 1: Site categorisation

Site Size	**Net Internal Area**
Large	>=2250m2
Medium	<=2249m2
Small	<=400m2

The list of occupied sites and net internal areas, to which this programme is applies, is outlined in **Appendix A.**

Each site has a number of building assets. To standardise the structure of how assets are captured and managed within the database, a three tier New Rules of Measurement (NRM) standard has been adopted from BSRIA BG 68/2017 – Classification.

Each of the occupied sites have assets in line with NRM and have been summarised below: -

- **Substructure** – Building assets underground
- **Superstructure** – Elements of building structure
- **Internal Fabric** – Internal finish items
- **Fixtures, Furnishings & Equipment** – Audio Visual (AV) equipment, desks, chairs, agile furnishings
- **Mechanical & Electrical Services** – Lighting, fire protection, power distribution, HVAC
- **External Fabric** – External finish items
- **Security** – Physical and technological security assets

The cost model groups assets into the above categories and uses CIBSE data to define grouped average lifecycle frequencies to generate an annual capital replacement requirement. The cost model uses SPONS 2019 price book data as a rate per meter squared (£/m2) for baseline replacement cost data.

A full list of property asset classification is outlined in **Appendix B.**

4 Problem Statement

Why are we doing this work and what happens if we do nothing?
The occupied property estate is aging and has a wide variety of building assets in varying age and condition, many of which are reaching or have exceeded their economic and/or technological lifecycle.

Assets are maintained during the operation and maintenance phase of their lifecycle by Planned Preventative Maintenance (PPM) and Reactive Repair Maintenance (RRM) via the Property Helpdesk as part of operations and maintenance (OPEX) budgets for each network.

Despite a regime of planned and reactive maintenance, building assets degrade through normal wear and tear and become obsolete due to age and advancements in technology. As technology advances and the needs of the core business change over time, property assets become no longer fit for purpose.

If we choose to do nothing and exceed the existing assets past their economic life, we would see failure rates increase, leading to increased business risks and costs in the following areas: -

- **Economic** – Increased repair costs due to increased frequency of failure and utility/carbon cost wastage through operating inefficient assets beyond economic life;
- **Safety, Security and Legislation** – Unplanned failures of assets leading to safety and security incidents and potential intervention / prosecution;
- **Business Disruption** – Loss of building function leading to partial or total business continuity incidents having indirect impact to customers or breach of licence conditions;
- **Productivity Loss** - Decreases in staff productivity due to poor quality working conditions negatively impacting on staff health and wellbeing.

What is the outcome that we want to achieve?
The outcome that we want to achieve is to maintain the operational standards of our occupied sites and reducing the business risks mentioned above.

Following an economic assessment, the preferred intervention option is the pre-emptive end of life replacement of assets on a like for like basis and to the currently available specification. Energy efficiency, sustainability and innovation improvements will be introduced where possible and is a continuation of the developing strategy development started in financial year 2017/18 of GD1.

The model assumes a proportional approach to asset age / condition, based on a desktop assessment, as follows: -

1. 25% in As New Condition
2. 25% in Good Condition
3. 25% in Poor Condition
4. 25% in End of Life Condition

How will we understand if the spend has been successful?
Successful delivery of the programme will deliver annual projects over GD2 to replace the 25% of assets in an end of life condition, resulting in a steady state of asset failures within or lower than the stated failure rates as benchmarked in our asset management system, with stable operations and maintenance Opex expenditure with a positive bias to planned over reactive maintenance.

4.1 Narrative Real-Life Example of Problem

The following are examples of two real life examples of assets within our sites, in differing stages of their lifecycle. The asset groupings are defined in **Table 2**.

Table 2: Asset groups

Level 1 – Group Element	Level 2 – Element	Level 3 – Sub-element
5 – Mechanical & Electrical	7 – Electrical Installation	2 – Power Installations
7 – Security	1 – Security Systems	1 - CCTV

NOTE: See **Appendix B** - Asset classification for full list

Electrical Installation

Image 1 is of an end of life electrical switch gear which is classed as being at an end of life state. It was installed circa 1970 and is beyond its projected 30-year lifecycle (CIBSE Guide M). The asset is obsolete, parts are no longer available resulting in increased cost of maintenance/repair and increased risk of failure, resulting in loss of building / business continuity (BCM) incident.

Image 2 is of an asset in a "Good" condition. It is an electrical switch gear installed in 2009 and has 20 years of lifecycle remaining. It is of modern design and meets current code. Parts are available resulting in efficient maintenance/repair.

Image 1

Image 2

Security Installations

Image 3 shows CCTV assets at an end of life state. **Image 5** is a snapshot of the quality of image recorded. It is poor quality infrared, rendering it ineffective at night. This quality of image is no longer fit for purpose in relation to monitoring, detection or prevention and increases business risk. The technology is also obsolete, resulting in increased reactive repair/replacement costs.

Image 4 shows CCTV assets that have been recently replaced. **Image 6** is a snapshot of images recorded. The quality, clarity and definition both during the day and at night ensures it is fit for purpose and reduced risk and cost.

Image 3

Image 4

Image 5

Image 6

4.2 Spend Boundaries

What is in Scope?
Assets covered will include the following assets (Non-exhaustive list): -

- **Substructure Assets** – Disposal installations (storm and foul drains). Incoming services supplies (gas, electricity and water). Underground installations (interceptors, septic tanks, cesspits)
- **Superstructure Assets** – Frames, upper floors and stairs (steel frames, slabs, fire protection, stairs). Roof and roof structures (slabs, decks, purlins, trusses, cladding, capping and coverings)
- **Internal Fabric** – Internal walls, partitioning and doors. Wall finishes. Ceiling finishes. Breakout/tea points
- **Fixtures, Fittings and Equipment** – Fixtures and Fittings (Toilets, cubicle systems, vanity ware, areas, partition systems, appliances, blinds, notice boards). Office Furniture (cupboards, storage systems, signage, lockers and changing facilities, desks, agile furnishings, chairs, meeting room furniture, AV equipment). Disposal Installations (above ground drainage and pipework)

- **Mechanical & Electrical Services** – Water Installations (water supply pipes). Space heating and cooling (Radiators, heaters, underfloor systems, non-critical air-conditioning systems, building control systems, ducts). Electrical and Gas Installations (incoming supply, switchgear, LV distribution systems, lighting systems, electric heaters, non-critical fans, filters, screen, louvres, curtain heaters, non-emergency lighting, containment, timers and switches, ductwork). Protective Installations (lightening protection, earthing and bonding, emergency lighting). Communication Installations (fire and smoke detection, fire alarm systems, alarms). Lifting Installations (passenger and goods lift, building related lifting equipment) Specialist installations (building management systems, weighbridge, Information and Communication Technology
- **External Fabric** – External furnishing, signage, cycle shelters, landscaping, car parking, wash bays
- **Security** – CCTV, automated access control, intruder detection systems, fencing gate and barriers

What is out of Scope?
Assets not classified as an "occupied property" are excluded from this programme. These assets fall under the remit of other functions within SGN.

The asset lifecycle is a recurring programme of work. Conditions affecting asset lifecycle replacement, which will be monitored during the operation and maintenance phase include;

- **Internal and External Environments** – Factors specific to the asset e.g. proximity to sea air
- **Technology Changes** – Evolution of technology resulting in obsolescence
- **Design and Specification** – Older buildings and asset systems do not meet modern standards or requirements
- **Use** – The change of use of buildings or an increase in occupation density
- **Maintenance** – If scheduled maintenance has been carried out effectively
- **Hours of Operation** – Some sites are in use longer resulting in increased duty (e.g. Gas Control – 24/7)

5 Probability of Failure

Manufacturer information, market testing, failure rate prediction and historical data have been used by CIBSE to generate indicative lifecycle replacement frequencies as part of the planned replacement model.

As part of the asset management strategy development fault recording via the property helpdesk started in 2019/20 at asset group level. Fault recording will improve as part of the development of the asset database. A steady state of asset failure is assumed at 60% of recorded failures taken from property helpdesk data from financial year 19/20 YTD, which has been used as the baseline failure data in the CBA model and has produced the following frequencies in **Table 3**: -

Table 3: Baseline failure data

Asset Group	Steady State Failures	MTTF (Hours)
Substructure	36	3074
Superstructure	36	3074
External Fabric	143	769
Internal Fabric	394	279
Fixtures, Fittings & Equipment	250	439
Mechanical and Electrical	1186	93
Security	199	553

NOTE: The above failure rates have been used in the CBA, which assumes an increased frequency of failure rate for assets in an end of life condition

5.1 Probability of Failure Data Assurance

The failure rate information was extrapolated from the property and security helpdesk and alarm receiving centre (ARC) data on reported faults.

The development of the asset database will improve failure rate information which will be captured at asset level once fully implemented. This data will be used, in addition to an end of life condition assessment to generate the asset replacement programme data.

The planned lifecycle replacement model has used CIBSE asset lifecycle data (as outlined in CIBSE Guide M) and other industry data to generate the indicative asset replacement frequencies. These frequencies have been averaged in the cost model to generate the average asset category replacement frequencies and replacement costs.

6 Consequence of Failure

Increased failure rates or catastrophic failure of occupied building assets could potentially have the following impacts: -

- **Indirect Loss of supply to customers** – Some of our large sites house business critical functions which, in the event of an unplanned loss of building, could result in indirect loss of supply or disruption to service during a BCM event
- **Health, Safety, Security and Welfare** - Realisation of associated risks to the health, safety, security and wellbeing of employees being impacted by asset failure. e.g. Electrical safety due to failure of protective devices, wellbeing impact due to loss of heating/hot water, security risks associated with unauthorised access to site and damage/theft to critical assets
- **Non-compliance / HSE intervention** – Asset failure can lead to statutory compliance non-conformance, which could lead to HSE intervention/prosecution
- **Increased OPEX expenditure** – Assets at end of economic life will result in increased OPEX spend on corrective maintenance
- **Human Resource** – Indirect impact on productivity and increased turnover due to the provision of poor-quality working and wellbeing environments for staff
- **Environmental impact** – Economical or technological end of life assets will result increased costs in utilities and carbon costs until they are replaced. This will have a detrimental impact in our business energy and sustainability strategy and environmental action plan. Inadequate security measures have the potential to facilitate negative environmental impacts

7 Options Considered

The following intervention options were considered:

1. Repair on Failure – do nothing
2. Pre-emptive Replacement

7.1 Repair on Failure

The baseline option meaning that we will continuing to repair assets on failure was considered and costed. However, it was not deemed the preferred option due to the increased costs associated with the continued replacement of aging assets.

The total cost of repair on failure (baseline) is **£15.64m**. The CBA model factors in monetised costs against probabilities in the following areas: -

- **Economic** – Direct cost of increased frequency of failure for end of life assets.
- **HSE Impact** – Cost of realisation of increased risk of HSE.
- **Breach of Licence Condition** – Indirect costs associated with indirect breaches of licence conditions through loss of buildings.
- **Productivity** – Impact of productivity loss through the provision of poor-quality working and welfare environments.

7.2 Pre-emptive Replacement

This option is deemed the most cost-effective option that achieves the stated objective of providing fit for purpose occupied buildings, minimising business risk, maximising cost avoidance and maintaining levels staff productivity and wellbeing.

The total cost of pre-emptive replacement at end of life is **£12.56m**. The CBA model factors in the cost of pre-emptive end of life replacement of assets which reduces or removes the likelihood and impact of increased cost of failures and the likelihood and impact of failures resulting in unplanned loss of site / BCM incidents. The model assumes that 25% of property assets are at end of life and will be pre-emptively replaced over a 5-year period (GD2).

Replacement costs have been projected using a cost model, based on a large, medium and small site using SPONS price book data to generate a £/m2 replacement cost per asset type. The replacement cost model is included in Appendix C – Replacement Cost Model

The perceived benefits of this option is the avoided costs detailed in **Table 4** below.

Table 4: Avoided costs

Cost Area	Description	Cost £m
Reactive Repairs	Cost of reactive repairs increased due to increased frequency of failure of assets at end of life.	7.48
Breach of Licence	Risk based on probability from indirect breach of licence through unplanned loss of building.	0.12
HSE Fines / Intervention	Costs through HSE fines and/or intervention resulting from unsafe conditions and/or incidents or accidents resulting from building asset failure.	0.01
Accidents	Direct cost of incidents or accidents resulting from failure of building assets.	0.09
BCM	Direct cost of loss of site resulting in 1-day BCM.	3.61

Loss of Productivity	Perceived loss of 1% productivity through provision of poor-quality working and welfare environments.	4.33

7.3 Options Technical Summary Table

A summary of all technical options is detailed in **Table 5** below.

Table 5: Technical summary

Option	First Year of Spend	Final Year of Spend	Volume of Interventions	Equipment / Investment Design Life	Total Cost £m
Do nothing (baseline)	2022	2022	0	5-70 years	15.64
Pre-emptive replacement	2022	2026	Various	5-70 years	12.56

Note: The design life of property assets varies significantly between asset types.

7.4 Options Cost Summary Table

A cost summary table that provides a breakdown of the costs for option 2 Pre-emptive replacement is detailed in **Table 6** below. **Table 7** provide an annual cost breakdown for GD2.

Table 6: Cost summary breakdown

Option	Cost Breakdown £m	Total Cost £m
Pre-emptive replacement Asset upgrade and replacement of plant and equipment per category	Categories: • Substructure - 1.95 • External fabric - 2.32 • Internal fabric – 1.52 • Fixtures Fittings & Equipment – 0.69 • Mechanical & Electrical – 3.50 • Prelims & Contingency – 0.06 • Security – 2.71	12.75
	Total	**12.75**
	Target efficiency	-0.19
	Total	**-0.19**

Table 7: GD2 cost breakdown

Options	2021/22 £m	2022/23 £m	2023/24 £m	2024/25 £m	2025/26 £m	Total £m
Do nothing	3.13	3.13	3.13	3.13	3.12	15.64
Pre-emptive replacement	2.54	2.52	2.51	2.50	2.49	12.56

8 Business Case Outline and Discussion

The probability of failure with aging assets as well as the associated business risks and cost of the repair on failure option is not deemed tolerable. Increased direct Opex costs associated with the indirect costs of risk realisation has resulted in recommended intervention recommendation of a programme of pre-emptive end of life asset replacement.

Successful delivery of this option will enable our business to effectively deliver properties that will continue to proactively support the needs of the core business, reduce increased costs and business risk.

8.1 Key Business Case Drivers Description

A summary of key business drivers for pre-emptive asset replacement at occupied buildings are set out in **Table 8** below. A summary of the CBA results is detailed in **Table 9** below.

Table 8: Key business case drivers

Option	Description of Option	Key Business Case Drivers
2	Pre-emptive Replacement	• Operation of assets efficiently and cost effectively within economic life; • Healthy assets achieve the core objective of providing safe and healthy welfare environments for staff; • Reduced operational and business risk associated with unplanned partial or total loss of site; • Meet all statutory and legislative compliance; • Minimise likelihood and impact of realisation of risks and hazards through failure of building assets.

Table 9: Summary of CBA results

NPVs based on Payback Periods								
Option	Description of Option	Preferred Option (Y/N)	Total Forecast Exp £m	Total NPV £m	2030 £m	2035 £m	2040 £m	2050 £m
Baseline	Do Nothing	N	-15.64	-73.13	-17.44	-26.98	-35.91	-51.25
1	Absolute NPV	Y	-12.56	-59.43	-14.08	-21.85	-29.11	-41.60
1	NPV relative to Baseline	Y	-12.56	-59.43	3.35	5.13	6.80	9.65

8.2 Business Case Summary

A summary table with the selected headline business case metrics is provided in **Table 10** below.

Table 10: Business case metrics

	Pre-emptive Replacement of Assets **£m**
Capex (£m)	12.56
Number of Interventions	0.00
Carbon Savings ktCO2e (GD2)	0.00
Carbon Savings ktCO2e /yr	0.00
Carbon Emission Savings (30yr PV, £m)	0.00
Other Environmental Savings (30yr PV, £m)	0.00
Safety Benefits (30yr PV, £m)	0.00
Other Benefits (30yr PV, £m)	0.00
Direct Costs (30yr PV, £m)	11.04
NPV (30yr PV, £m)	11.04
High Carbon Scenario	
Carbon Emission Savings (30yr PV, £m)	0.0
High Carbon NPV (30yr PV, £m)	11.04

9 Preferred Option Scope and Project Plan

9.1 Preferred option

The preferred GD2 option is pre-emptive replacement of 25% of property assets in an end of life condition at a total cost of **£12.56m.**

9.2 Asset Health Spend Profile

The spend profile for GD2 is detailed in **Table 11** below. The costs include efficiencies.

Table 11: GD2 spend profile

Asset Health Spend Profile						
Preferred option	2021/22 £m	2022/23 £m	2023/24 £m	2024/25 £m	2025/26 £m	Total £m
Pre-emptive Replacement	2.54	2.52	2.51	2.50	2.49	12.56

NOTE: Asset replacement expenditure is an ongoing programme of work

9.3 Investment Risk Discussion

The results from the CBA are detailed in **Tables 12-15** below.

Table 12: Risk matrix

Risk Description	**Impact**	**Likelihood**	**Mitigation / Controls**
Timeframe to deliver interventions	Medium	<=20%	Each install undertake at standalone project and be delivered with Project Management resource (In-house and outsourced as required). Project programmes will be determined and agreed with key stakeholders.
Availability of competent resource to deliver works	Medium	<=20%	Fully procured frameworks in place.
Business disruption during works	Medium	>20% & <=40%	Pre-emptive replacements will be undertaken as standalone projects. Full stakeholder consultation will be undertaken. Out of hours work and alternative accommodations to be implemented where applicable. Works will be planned in advance to minimise business impact.
Cancellation of Scheme	Medium	<=20%	Unlikely due to continuing legislation and building regulation.

Table 13: Capex sensitivity

	Low	Mid	High
GD2 Capex (£m)	9.42	12.56	18.84
Number of Interventions	0	0	0
Carbon Savings ktCO2e (GD2)	0	0	0
Carbon Savings ktCO2e /yr	0	0	0
Carbon Emission Savings (35yr PV, £m)	0	0	0
Other Environmental Savings (35yr PV, £m)	0	0	0
Safety Benefits (35yr PV, £m)	0	0	0
Other Benefits (35yr PV, £m)	0	0	0
Direct Costs (35yr PV, £m)	8.3	11.0	16.6
NPV (35yr PV, £m)	8.3	11.0	16.6

Project payback has not been carried out as part of this analysis due to the effect of the Spackman approach. For a cash-flow traditional project payback period please see scenario 4 of our Capitalisation Sensitivity table.

Table 14: Sensitivity assumptions

Spend Area	Scenario	Justification
Capex	High	Assumption of worst-case scenario or 50% increase in cost of labour and materials
	Mid	No change on original baseline.
	Low	Best case unlikely assumption in 25% reduction in cost of labour and materials
Opex	High	Assumption of worst-case scenario or 50% increase in cost of labour and materials
	Mid	No change on original baseline.
	Low	Best case unlikely assumption in 25% reduction in cost of labour and materials
Environmental Cost	High	Assumption of worst-case scenario or 50% increase in cost of labour and materials
	Mid	No change on original baseline.
	Low	Best case unlikely assumption in 25% reduction in cost of labour and materials

Capitalisation Sensitivity

Consumers fund our Totex in two ways – opex is charged immediately though bills (fast money – no capitalisation) and Capex / Repex is funded by bills over 45 years (slow money – 100% capitalisation). The amount deferred over 45 years represents the capitalisation rate. Traditionally in 'project' CBA's the cashflows are shown as they are incurred (with the investment up front which essentially is a zero-capitalisation rate). Therefore, we have developed scenarios that reflect both ways of looking at the investment – from a consumer and a 'project'.

The scenarios are summarised as follows:

- Scenario 1 - we have used the blended average of 65%, used in previous iterations of this analysis
- Scenario 2 - we have represented the Capex and Opex blend for the two networks, as per guidance
- Scenario 3 - addresses our concerns on capitalisation rates whereby Repex and Capex spend is deferred (100% capitalisation rate) and Opex is paid for upfront (0% capitalisation rate)
- Scenario 4 - this reflects the payback period in 'project' / cash-flow terms and provides a project payback

We have taken a view of the NPV in each of the scenarios, with the exception of scenario 4, at the 20, 35- and 45-Year points, to demonstrate the effect of Capitalisation Rate on this value.

Table 15: Capitalisation rate sensitivity results

Scenario	**1**	**2 SGN**	**3**	**4**
Capex (%)	65	41	100	0
Opex (%)	65	41	0	0
Repex (%)	100	100	100	0
Output				
NPV (20yr PV, £m)	6.19	7.11	4.85	
NPV (35yr PV, £m)	10.39	11.04	9.43	
NPV (45yr PV, £m)	12.47	12.94	11.80	
Payback	0.00	0.00	0.00	0.00

10 List of Acronyms and Reference Documentation

10.1 Acronyms

Acronym	Description
RICS	Royal institute of chartered surveyors
NRM	New rules of measurement
PPM	Planned preventative maintenance
RRM	Routine reactive maintenance
AV	Audio Visual
HVAC	Heating, ventilation, air conditioning
CCTV	Closed circuit television
LV	Low voltage
CIBSE	Chartered institute of building service engineers
CBA	Cost benefit analysis
BCM	Business continuity management
HSE	Health and safety executive
MTTF	Mean time to failure

10.2 Reference Documentation

Acronym	Description
CIBSE Guides (Guide M)	Management Engineering and Management
SPONS	Architects and Builders Price Book 144th Edition (2019)
SPONS	Mechanical and Electrical Services Price Book 50th Edition (2019)
RICS	New Rules of Measurement (2018)
RICS	BCIS Building Maintenance Price Book 39th Edition (2019)
BSRIA BG28 / 2017	Classification
BSRIA BG53 / 2016	Business Focused Maintenance

Appendix A - List of occupied sites

List of occupied sites		
Site Name	**Size in m2**	**Site size category**
Walton Park	10,450	Large Site
Ashford	4,038	Large Site
Horley	3,046	Large Site
St Mary Cray	2,513	Large Site
Edinburgh	2,432	Large Site
Epsom	1,956	Medium Site
Aldershot	632	Medium Site
Provan	2,018	Medium Site
Paisley	1,020	Medium Site
Glasgow	717	Medium Site
Segensworth	795	Medium Site
Bramshill	411	Medium Site
Burgess Hill	553	Medium Site
Redhill	431	Medium Site
Dumfries	267	Small Site
Horsham	357	Small Site
Dunfermline	359	Small Site
Gillingham	388	Small Site
Oban	146	Small Site
Thurso	144	Small Site
Wick	143	Small Site
Reading	144	Small Site
Stornoway	93	Small Site
Inverness	131	Small Site
Basingstoke	102	Small Site
Bexhill	31	Small Site
Campbeltown	353	Small Site
Galashiels	172	Small Site
Incholm	171	Small Site
Kilmarnock	375	Small Site
Broadstairs	256	Small Site
Braishfield	45	Small Site
Milton Keynes	179	Small Site
Whyteleaf	124	Small Site
Croydon TN	63	Small Site
Chichester	31	Small Site

Dorking	90	Small Site
Kennington DI	72	Small Site
Farningham	130	Small Site
Hardwick	51	Small Site
Marsh Gibbon	53	Small Site
Coatbridge	399	Small Site
Shorne	108	Small Site
Tatsfield	70	Small Site

Appendix B - Asset classification

Level 1 Group element	Level 2 Element	Level 3 Sub-element
1 Substructure	1 Substructure	1 Standard foundations 2 Specialist foundations 3 Lowest floor construction 4 Basement excavation 5 Basement retaining wall
2 Superstructure	1 Frame	1 Steel frame 2 Space frames/decks 3 Concrete frames 4 Timber frames 5 Specialist frames
	2 Upper floors	1 Floors 2 Balconies 3 Drainage to balconies
	3 Roof	1 Roof structure 2 Roof coverings 3 Specialist roof systems 4 Roof drainage 5 Rooflights, skylights and openings 6 Roof features
	4 Stairs and ramps	1 Stair/ramp structures 2 Stair/ramp finishes 3 Stair/ramp balustrades and handrails 4 Ladders/chutes/slides
	5 External walls	1 External walls above ground 2 External walls below ground 3 Solar/rain screening 3 Solar/rain screening
	6 Windows and external doors	1 External windows 2 External doors
	7 Internal walls and partitions	1 Walls and partitions 2 Balustrades and handrails 3 Moveable room dividers 4 Cubicles
	8 Internal doors	1 Internal door
3 Internal finishes	1 Wall finishes	1 Wall finishes
	2 Floor finishes	1 Finishes to floors 2 Raised access floors
	3 ceiling finishes	1 Finishes to ceilings 2 False ceilings 3 Suspended ceilings
4 Fittings, furnishings and equipment	1 Fittings, furnishing and equipment	1 General fittings, furnishings and equipment 2 Kitchen fittings and equipment 3 Special purpose fittings, furnishings and equipment 4 Signs/notices 5 Works of art

		6 Non-mechanical and no-electrical equipment 7 Internal planting 8 Bird and vermin control
5 M&E	1 Sanitary installation	1 Sanitary appliance 2 Sanitary ancillaries
	2 Services equipment	1 Services equipment
	3 Disposal installations	1 Foul drainage above ground 2 Refuse disposals
	4 Water installations	1 Mains water supply 2 Cold water distribution 3 Hot water distribution 4 Local hot water distribution 5 Steam and condensate distribution
	5 Space heating and air conditioning	1 Central heating 2 Local heating 3 Central cooling 4 Local cooling 5 Central heating and cooling 6 Local heating and cooling 7 Central air conditioning 8 Local air conditioning
	6 Ventilation	1 Central ventilation 2 Local and special ventilation 3 Smoke extract/control
	7 Electrical installations	1 Electrical mains and sub-mains distribution 2 Power installations 3 Lighting installations 4 Specialist lighting installations incl emergency 5 Local electricity generation systems 6 Earthing and bonding systems
	8 Fuel installations	1 Fuel storage 2 Fuel distribution systems
	9 Lift and conveyor installations	1 Lifts and enclosed hoists 2 Escalators 3 Powered stairlifts 4 Conveyors 5 Dock levellers and scissor lifts 6 Cranes and enclosed hoists 7 Lift and conveyor systems
	10 Fire and lightning protection	1 Firefighting systems 2 Fire suppression systems 3 Lightning protection
	11 Communication, security and control systems	1 Communication systems 2 Security systems 3 Central control/building management system
	12 Specialist installations	1 Specialist mechanical installations 2 Specialist electrical/electronic installations 3 Water features

6 External works	1 Roads, path, paving and surfacing	1 Roads, paths and paving 2 Special surfacing and paving
	2 Fencing, railings and walls	1 Fencing and railings 2 Walls and screens 3 Retaining walls 4 Barriers and guardrails
	3 External fixtures	1 Site/street furniture and equipment 2 Ornamental features
	4 External services	1 Water mains supply 2 Electricity mains supply 3 External transformation devices 4 Electricity distribution to external plant and equipment 5 Gas mains supply 6 Telecommunications and other communication system connections 7 External fuel storage and piped distribution systems 8 External security systems 9 External/street lighting systems
7 Security	1 Security Systems	1 CCTV systems 2 Access control systems 3 Intruder alarms 4 Gates and Barriers 5 Fencing 6 Communication Systems

Appendix C - Replacement cost model

Large sites

Asset Tier	Assets System/Group	Ave. Lifecycle	Rate / m2 (£)	Large (£)	Typical assets/components to upgrade / replace
Substructure	Disposal imstallations (Below ground)	42.5	3.05	13712.8	Drains (Foul and Storm), Drainage systems, interceptors, septic tanks.
	Incoming services supply	35	1.66	7463.36	Supply installations for electric/gas/water.
Superstructure	Frame, upper floors and stairs	70	147.93	665093.28	Steel frames, slabs, fire protection, staircases, shafts and risers.
	Roof and roof structures	40	64	287744	Slabs, decks, trusses, purlins, coverings, cappings and insulation (Reduced from 121.02 to 64.00 following review of tendered SGN Jobs)
External Fabric	External wall, windows and doors	40	146	656416	Window systems, doors, fire doors, cladding, blockwork. (Reduced from £165.85 to £146.00 following review of tendered SGN projects)
	Specialist equipment	25	110.84	498336.64	Weighbridge, Wash Bay, External Storage (Weighbridge £20k, Wash Bay £15k, Street Furniture £30k @10.84m2 + External Storage @£100/m2 (Building only)
Internal Fabric	Internal walls, partitions and doors	30	61.1	274705.6	Blockwork, drywall partitions, screens, frames, ironmongery, WC cubicles.
	Wall finishes (to cat A)	6	17.76	79848.96	Paint to blockwork and drywall partions, finishes to workwork. (Shell and Core + Cat A)
	Floor finishes (To Cat A)	7	51.99	233747.04	Screeds, carpet tile, ceramics, rasied flooring, hard flooring, barrier matting. (Shell and core + Cat A)
	Ceiling finishes (to Cat A)	25	35	157360	Plasterboard and skim, ceiling grid. (Shell and core + Cat A. Reduced to £35/m2 from £57.23 following review of tendered SGN projects)
	Breakout/tea point fit out (to Cat B)	6	2.77	12453.92	Fire rated partitions, slip resistant floor, mechanical/electrical installation, joinery and units, fittings and equipment (1% of m2 fit out @2.77)
Fixtures Fittings and Equipment	Fixtures and fittings (To Cat B)	18	9.51	42756.96	Statutory signage and wayfinding, metalwork, vanity units, architectual fitting (Shell and core + Cat A + SGN Metric @ £2/m2)
	Office Furniture (Desks, chairs, storage, inc agile working options)	10	58.98	265174.08	Average m2 furniture metric for
	Sanitary Appliances (Shell and Core)	12	4.7	21131.2	WC suites, sanitary ware and fittings.
	Disposal Installations (above ground)	45	3.06	13757.76	Waste, soil and vent installations (UPVc Replacement) inc rainwater disposal.
Mechanical and Electical	Water installations (Shell and Core)	38	0.63	2832.48	Hot and cold water supply systems
	Space heating/cooling, air handling and ventilation systems (To Cat A)	25	177.62	798579.52	Air handling units, ac/cooling systems, duct and pipework, extraction systems. (Shell and Core + Cat A. Reduced from £215.39/m2 to 177.62/m2 following a review of tendered SGN projects)
	Electrical and gas installations (To Cat A)	20	125.18	562809.28	Mains, sub mains, distribution systems, IT Structured cablibg, small power and lighting. (Shell and Core + Cat A)
	Protective Installations (To Cat A)	35	17.97	80793.12	Lightening protection, earting and bonding. (Shell and Core + Cat A)
	Comminication Installations (To Shell and Core)	20	6.91	31067.36	Fire and smoke detection, disabled alarms. (Shell and Core Only)
	Specialist Installations (To Cat A)	10	35.64	160237.44	Building management, energy management, control systems. (Shell and core + Cat A)
	Lifting Installations	25	40	179840	Typical passanger lift, hydraulic eight person serving 2 floors (Reduced from 59.25 to 40m2 following review of tendered SGN Jobs)
Preliminaries and Contingency	Contractor management, plant, staturory works, provisional works	5	6.39	28729.44	Management and accomodations for contract staff, services and facilities for works, plant, work by statutory bodies, provisional works and contingencies.
Security	CCTV	5	49	220304	CCTV cameras, associated technology, recording devices, telemetry, night vision.
	Intruder Detection	5	9	40464	Perimeter detection, alarms, beams, assiciated technology, communication technology.
	Video Intercom	5	20	89920	Camera equipment, telephony, structured cabling, telemetry associated technology.
	Access Control & Data	5	73	328208	Server hardware, structure cabling, communications, software platform, hardware, readers, ironmongery.
	Gates and Barriers	10	35	157360	Physical access gates, barriers.
	Fencing	10	54	242784	low, medium and high security specifiation fencing.
Average Large Site (m2)	4496				

Medium sites

Asset Tier	Assets System/Group	Ave. Lifecycle	Rate / m2 (£)	Medium (£)	Typical assets/components to upgrade / replace
Substructure	Disposal imstallations (Below ground	42.5	3.05	2882.25	Drains (Foul and Storm), Drainage systems, interceptors, septic tanks.
	Incoming services supply	35	1.66	1568.7	Supply installations for electric/gas/water.
Superstructure	Frame, upper floors and stairs	70	147.93	139793.85	Steel frames, slabs, fire protection, staircases, shafts and risers.
	Roof and roof structures	40	64	60480	Slabs, decks, trusses, purlins, coverings, cappings and insulation (Reduced from 121.02 to 64.00 following review of tendered SGN Jobs)
External Fabric	External wall, windows and doors	40	146	137970	Window systems, doors, fire doors, cladding, blockwork. (Reduced from £165.85 to £146.00 following review of tendered SGN projects)
	Specialist equipment	25	110.84	104743.8	Weighbridge, Wash Bay, External Storage (Weighbridge £20k, Wash Bay £15k, Street Furniture £30k @10.84m2 + External Storage @£100/m2 (Building only)
Internal Fabric	Internal walls, partitions and doors	30	61.1	57739.5	Blockwork, drywall partitions, screens, frames, ironmongery, WC cubicles.
	Wall finishes (to cat A)	6	17.76	16783.2	Paint to blockwork and drywall partions, finishes to workwork. (Shell and Core + Cat A)
	Floor finishes (To Cat A)	7	51.99	49130.55	Screeds, carpet tile, ceramics, hard flooring, barrier matting. (Shell and core + Cat A)
	Ceiling finishes (to Cat A)	25	35	33075	Plasterboard and skim, ceiling grid. (Shell and core + Cat A. Reduced to £35/m2 from £57.23 following review of tendered SGN projects)
	Breakout/tea point fit out (to Cat B)	6	2.77	2617.65	Fire rated partitions, slip resistant floor, mechanical/electrical installation, joinery and units, fittings and equipment (1% of m2 fit out @2.77)
Fixtures Fittings and Equipment	Fixtures and fittings (To Cat B)	18	9.51	8986.95	Statutory signage and wayfinding, metalwork, vanity units, architectual fitting (Shell and core + Cat A + SGN Metric @ £2/m2)
	Office Furniture (Desks, chairs, storage, inc agile working options)	10	58.98	55736.1	
	Sanitaty Appliances (Shell and Core)	12	4.7	4441.5	WC suites, sanitary ware and fittings.
	Disposal Installations (above ground)	45	3.06	2891.7	Waste, soil and vent installations (UPVc Replacement) inc rainwater disposal.
Mechanical and Electical	Water installations (Shell and Core)	38	0.63	595.35	Hot and cold water supply systems
	Space heating/cooling, air handling and ventilation systems (To Cat A)	25	177.62	167850.9	Air handling units, ac/cooling systems, duct and pipework, extraction systems. (Shell and Core + Cat A. Reduced from £215.39/m2 to 177.62/m2 following a review of tendered SGN projects)
	Electrical and gas installations (To Cat A)	20	125.18	118295.1	Mains, sub mains, distribution systems, small power and lighting. (Shell and Core + Cat A)
	Protective Installations (To Cat A)	35	17.97	16981.65	Lightening protection, earting and bonding. (Shell and Core + Cat A)
	Comminication Installations (To Shell and Core)	20	6.91	6529.95	Fire and smoke detection, disabled alarms. (Shell and Core Only)
	Specialist Installations (To Cat A)	10	35.64	33679.8	Building management, energy management, control systems. (Shell and core + Cat A)
	Lifting Installations	25	0	0	Typical passanger lift, hydraulic eight person serving 2 floors
Preliminaries and Contingency	Contractor management, plant, staturory works, provisional works	5	6.11	5773.95	Management and accomodations for contract staff, services and facilities for works, plant, work by statutory bodies, provisional works and contingencies.
Security	CCTV	5	49	46305	CCTV cameras, associated technology, recording devices, telemetry, night vision.
	Intruder Detection	5	9	8505	Perimeter detection, alarms, beams, assiciated technology, communication technology.
	Video Intercom	5	20	18900	Camera equipment, telephony, structured cabling, telemetry associated technology.
	Access Control & Data	5	73	68985	Server hardware, structure cabling, communications, software platform, hardware, readers, ironmongery.
	Gates and Barriers	10	35	33075	Physical access gates, barriers.
	Fencing	10	54	51030	low, medium and high security specifiation fencing.
Average Medium Site (m2)	945				

Small sites

Asset Tier	Assets System/Group	Ave. Lifecycle	Rate / m2 (£)	Small (£)	Typical assets/components to upgrade / replace
Substructure	Disposal imstallations (Below ground	42.5	3.05	515.45	Drains (Foul and Storm), Drainage systems, interceptors, septic tanks.
	Incoming services supply	35	1.66	280.54	Supply installations for electric/gas/water.
Superstructure	Frame, upper floors and stairs	70	147.93	25000.17	Steel frames, slabs, fire protection, staircases, shafts and risers.
	Roof and roof structures	40	64	10816	Slabs, decks, trusses, purlins, coverings, cappings and insulation (Reduced from 121.02 to 64.00 following review of tendered SGN Jobs)
External Fabric	External wall, windows and doors	40	146	24674	Window systems, doors, fire doors, cladding, blockwork. (Reduced from £165.85 to £146.00 following review of tendered SGN projects)
	Specialist equipment	25	110.84	18731.96	Weighbridge, Wash Bay, External Storage (Weighbridge £20k, Wash Bay £15k, Street Furniture £30k @10.84m2 + External Storage @£100/m2 (Building only)
Internal Fabric	Internal walls, partitions and doors	30	61.1	10325.9	
	Wall finishes (to cat A)	6	17.76	3001.44	Paint to blockwork and drywall partions, finishes to workwork. (Shell and Core + Cat A)
	Floor finishes (To Cat A)	7	51.99	8786.31	Screeds, carpet tile, ceramics, hard flooring, barrier matting. (Shell and core + Cat A)
	Ceiling finishes (to Cat A)	25	35	5915	Plasterboard and skim, ceiling grid. (Shell and core + Cat A. Reduced to £35/m2 from £57.23 following review of tendered SGN projects)
	Breakout/tea point fit out (to Cat B)	6	2.77	468.13	Fire rated partitions, slip resistant floor, mechanical/electrical installation, joinery and units, fittings and equipment (1% of m2 fit out @2.77)
Fixtures Fittings and Equipment	Fixtures and fittings (To Cat B)	18	9.51	1607.19	Statutory signage and wayfinding, metalwork, vanity units, architectual fitting (Shell and core + Cat A + SGN Metric @ £2/m2)
	Office Furniture (Desks, chairs, storage, inc agile working options)	10	58.98	9967.62	
	Sanitaty Appliances (Shell and Core)	12	4.7	794.3	WC suites, sanitary ware and fittings.
	Disposal Installations (above ground)	45	3.06	517.14	Waste, soil and vent installations (UPVc Replacement) inc rainwater disposal.
Mechanical and Electical	Water installations (Shell and Core)	38	0.63	106.47	Hot and cold water supply systems
	Space heating/cooling, air handling and ventilation systems (To Cat A)	25	177.62	30017.78	Air handling units, ac/cooling systems, duct and pipework, extraction systems. (Shell and Core + Cat A. Reduced from £215.39/m2 to 177.62/m2 following a review of tendered SGN projects)
	Electrical and gas installations (To Cat A)	20	125.18	21155.42	Mains, sub mains, distribution systems, small power and lighting. (Shell and Core + Cat A)
	Protective Installations (To Cat A)	35	17.97	3036.93	Lightening protection, earting and bonding. (Shell and Core + Cat A)
	Comminication Installations (To Shell and Core)	20	6.91	1167.79	Fire and smoke detection, disabled alarms. (Shell and Core Only)
	Specialist Installations (To Cat A)	10	35.64	6023.16	Building management, energy management, control systems. (Shell and core + Cat A)
	Lifting Installations (Not applicable for small sites)	25	0	0	Typical passanger lift, hydraulic eight person serving 2 floors
Preliminaries and Contingency	Contractor management, plant, staturory works, provisional works	5	6.63	1120.47	Management and accomodations for contract staff, services and facilities for works, plant, work by statutory bodies, provisional works and contingencies.
Security	CCTV	5	49	8281	CCTV cameras, associated technology, recording devices, telemetry, night vision.
	Intruder Detection	5	9	1521	Perimeter detection, alarms, beams, assiciated technology, communication technology.
	Video Intercom	5	20	3380	Camera equipment, telephony, structured cabling, telemetry associated technology.
	Access Control & Data	5	73	12337	Server hardware, structure cabling, communications, software platform, hardware, readers, ironmongery.
	Gates and Barriers	10	35	5915	Physical access gates, barriers.
	Fencing	10	54	9126	low, medium and high security specifiation fencing.
Average Large Site (m2)	169				